

Changes in soil parameters under continuous plastic mulching in strawberry cultivation

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Plastic mulching (PM) is a widely used practice in modern agriculture because they generate conditions for optimal yield rates and quality. However, information about long-term effects of PC on soil quality parameters is scarce. The aim of this study is to compare the effect of three different mulching managements on soil quality parameters.

Sampling and methodology: Three different managements were studied: Organic mulching (OM), 2-years PM and 4-years PM. Soil samples were collected from irrigated fields in 0-5, 5-10 and 10-30 cm depths and analyzed for water content (WC), pH, dissolved organic carbon (DOC), total soil carbon (C_{tot}) and cation exchange capacity (CEC_{eff}).

Results and discussion: Mulching management has an influence on soil parameters. The magnitude of the effects is influenced by the type (organic agriculture practice vs. plastic mulching practice) and duration of the mulching. PM modified the water distribution through the soil column. WC values at the root zone were in average 10% higher compared to those measured at the topsoil. Under OM, the WC was lower than under PM. The pH was mainly influenced by the duration of the managements with slightly higher values after 4 than after 2-years PM. Under PM, aqueous extracts of the topsoil (0-5 cm depth) contained in average with 8.5 ± 1.8 mg/L higher DOC than in 10-30 cm depth with 5.6 ± 0.5 mg/L, which may indicate a mobilization of organic components in the upper layers. After 4-years PM, C_{tot} values were slightly higher than after 2-years PM and after OM. Surprisingly, after 4-years PM, CEC_{eff} values were with 138 – 157 mmolc/kg almost 2-fold higher than after 2-years PM and OM which had with 74 – 102 mmolc/kg comparable CEC_{eff} values.

Long-term PM resulted in changes of soil pH and slightly increased C_{tot} which probably enhanced the CEC_{eff} of the soil. However, further investigations of the effect of PM on stability of soil organic matter and microbial community structure are needed.